OWNER'S MANUAL

Ref 0.5
Anno

HIGH PERFORMANCE AMPLIFIERS

B2 has through years of dedication introduced our line of *Ref 0.5 & Anno* amplifiers.
The *B2* line up are made to fullfil our philosophy for amplifiers; A variety of applications, highest possible efficiency and great appearance.
The *B2* amplifiers are designed to produce high power levels even from stock electrical systems. High efficiency is created from updating every stage through the amplifiers' circuit. High speed controller chipsets, efficient power devices, precise thermal management and the best engineering are the cornerstones of the *B2* amplifier series.

1. FEATURES

FEATURES	*Ref 0.5*	*Anno*
Circuit Configuration	Ultra Class D Mono	4ch 1 ohm Stable class AB
Frequency Response	: 20Hz ~ 250Hz	: 20Hz ~ 30KHz
Signal to Noise Ratio	: 100dB	: 105dB
Input Sensitivity	: 6V ~ 0.2V	: 8V ~ 0.2V
Crossover	: 24dB / Oct	: 24dB / Oct
High Pass Filter	: no	: 15(150)Hz ~ 400(4K)Hz, x1, x10
Low Pass Crossover Range	: 20Hz ~ 200Hz	: 40(400)Hz ~ 400(4K)Hz, x1, x10
Subsonic Crossover Range	: 10Hz ~ 50Hz	: NO
Bass Boost	: 0 ~ 9dB	: NO
Phase	: 0 ~ 180 Degree	: NO
Output Master / Input Slave	: YES	: NO
Remote Control	: YES	: YES
Damping Factor	: 250<	: 500<
Power Terminal gauge	: 0 ga x 1	: 0 ga x 1
Fuse Rating	: 250A (Linked : 500A)	: 240A (External Fuses)

All features are subject to change in the continuing effort to improve the products without notice

***B2* series output power**

	POWER @ 4OHM	POWER @ 2 OHM	POWER @ 1OHM
Ref 0.5	770W x 1	1400W x 1	2650W x 1

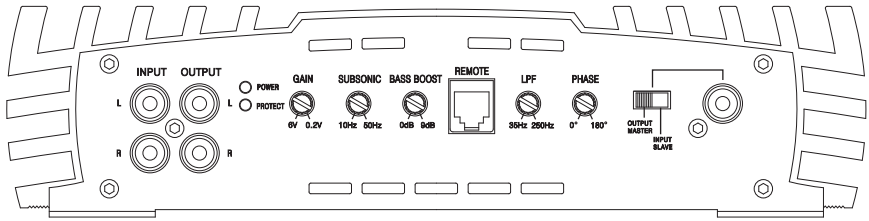
	POWER @ 4OHM	POWER @ 2 OHM	POWER @ 1 OHM
Anno	150W x 2 + 270W x 2	260W x 2 + 440W x 2	360W x 2 + 610W x 2

2. DESIGN FEATURES

1) *Ref 0.5* will allow stable operation as a single unit @ 4/2/1 ohms impedance.
   Ref 0.5 will allow daisy chain connections @ impedances down to 2 ohms.
2) *Anno* 4 channel 1 ohm stable class AB amplifier will allow stable operation @ 4/2/1 ohms stereo or 4/2 ohms mono.
3) *B2* amplifiers offer an advanced protection circuit for the benefit of the user.
   Speaker short circuitry, DC offset, Voltage sensor & thermal protection.
4) The *B2* pcb has been designed using a double sided board and features high current mosfet switching devices.
   Ref 0.5 has a 24 dB slope/Oct low pass & subsonic filter.
   Anno has a 24 dB slope/Oct high pass and low pass filter
5) *Ref 0.5 & Anno* offer wired remote level control which allows easy gain adjustment from the drivers seat.
6) *Ref 0.5* can be used in a daisy chain connection. This will allow bridging of 2 mono amplifiers @ 2 ohms to produce twice the power of one unit @ 1 ohm

3. CONTROL & CONNECTION

3-1. *Ref 0.5* CONTROL & CONNECTION



INPUT
Connect preamp signal cables from the headunit to RCA Input of *Ref 0.5*.

OUTPUT
Output RCA for signal routing to another amplifier.

POWER & PROTECTION INDICATOR
Power BLUE, Green-lit shows correct operation
Protect LED, RED-lit shows general malfunction, faulty connection or thermal protection

GAIN (6V ~ 0.2V)
Matching the output voltage of the headunit's RCA line-outs to *Ref 0.5* input section.

SUBSONIC FILTER (10Hz ~ 50Hz @ 24dB/Oct)
Adjusts the subsonic cut off point to eliminate low frequencies.

BASS BOOST
Variable bass boost from 0-9 dB @ 45 Hz

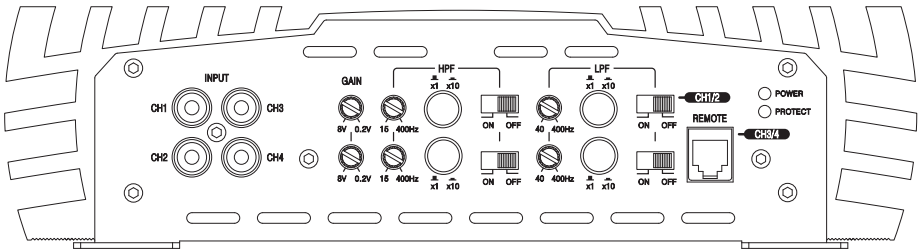
REMOTE LEVEL CONTROL PORT
Connection of external level control.

LOW PASS FILTER (35Hz ~ 250Hz @ 24dB/Oct)
Adjusts the cut off point for the low pass filter.

PHASE CONTROL
Variable phase adjustment from 0-180 degrees.

OUTPUT MASTER / INPUT SLAVE
For daisy chain connection of 2 *Ref 0.5* amplifiers down to 2 ohms.

3-2. Quattro CONTROL & CONNECTION



INPUT
Connect preamp signal cables from the headunit to RCA Input of *Anno*.

GAIN (6V ~ 0.2V)
Matching the output voltage of the headunit's RCA line-outs to *Anno* input section.

HIGH PASS FILTER (15Hz ~ 400Hz @ 24dB/Oct)
Adjusts the cut off point for the high pass filter.
The wide frequency range allows for "Active" speaker operation.

X1, X10 (HIGH PASS FILTER MULTIPLY)
It makes High pass filter frequency range 150Hz to 4KHz

HIGH PASS FILTER SELECTOR (ON-OFF)
It selects ON - OFF for high pass filter activity
It sets ON, High pass filter is active
But It sets OFF, High pass filter is not avtive

LOW PASS FILTER (40Hz ~ 400Hz @ 24dB/Oct)
Adjusts the cut off point for the low pass filter.

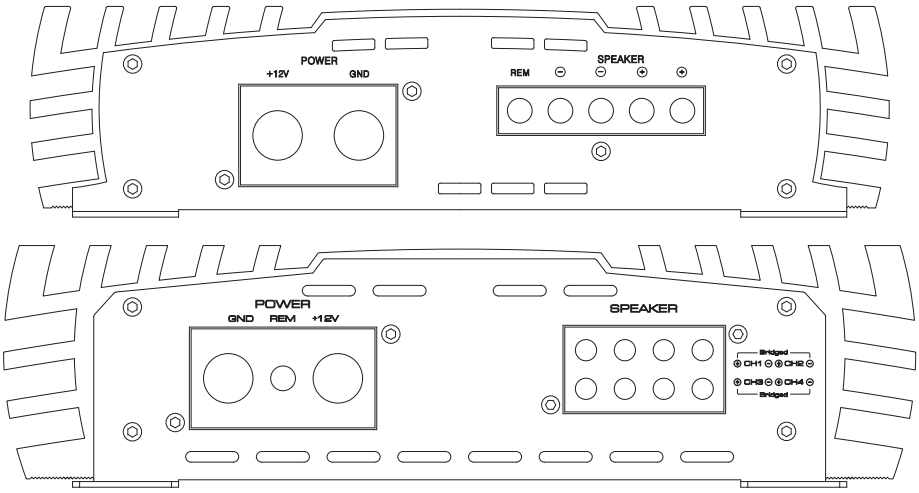
X1, X10 (LOW PASS FILTER MULTIPLY)
It makes High pass filter frequency range 400Hz to 4KHz

LOW PASS FILTER SELECTOR (ON-OFF)
It selects ON - OFF for Low pass filter activity
It sets ON, Low pass filter is active
But It sets OFF, Low pass filter is not avtive

REMOTE LEVEL CONTROL PORT
Connection of external level control.

POWER & PROTECTION INDICATOR
Power BLUE, Green-lit shows correct operation
Protect LED, RED-lit shows general malfunction, faulty connection or thermal protection

3-3. *Ref 0.5 & Anno* CONTROL & CONNECTION



GND (GROUND CONNECTION)
For connection to the chassis' ground.
For optimum performance 0 gauge cable is recommended.

+12V (POWER CONNECTION)
For connection to the positive terminal of the battery (+12). For optimum performance 0 gauge cable is recommended.

REM (REMOTE)
Connect to switched +12V with trigger from head unit.

SPEAKER OUTPUTS
Amplifier connection to loudspeakers.
Minimum speaker cable is 12 gauge.
Ref 0.5 minimum impedance is 1 ohm if used as a single unit.
Ref 0.5 in linked mode offers stable opearation to a minimum of 2 ohms.
Anno minimum impedance is 1ohms stereo or 4/2 ohms mono

4. INSTALLATION

If you chose to install the *B2* series by yourself, please read the owners' manual carefully. Before you start your installation, please take all steps into consideration. Otherwise, please go to www.b2-audio.com for authorized distributors or contact us directly for support.

4-1. MOUNTING PREPARATION

Disconnect the negative (—) battery cable before mounting *B2* series or making any connections. Check the battery and alternator ground (—) connections.
Make sure they are properly connected and free of corrosion. Before selecting a mounting location for the amplifier, please take cooling and safety into consideration.

4-2. MOUNTING PREPARATION

B2 amplifiers have been designed with a good heat radiation heatsink to avoid excessive heat from the amplifier circuitry. For optimum heat radiation performance, it is recommended to find a mounting location that allows for vertical installation of the heat sink fins.

For safety purposes, install the amplifier in a dry and well ventilated location and make sure no cables or other harness of the car is interfaced with the mounting location or will present a hazard to the cars' cable, control cables, fuel lines/tanks, hydraulic lines or other components of the vechicle.

4-3. +12V, GND, REM CONNECTION

12V (POWER CONNECTION)

Before mounting *B2* amplifiers, disconnect the negative (**–**) wire from the battery to protect any accidentlal damage to the amplifier or the audio system.
B2 series are designed to use 0 AWG power and Ground connection.
Connect the power cables to power terminal labeled as + 12V
Ref 0.5 & Anno are not equipped with Fuses. So you should use extral fuses.
connect one end of the fuse holder to the power cable and the other end of the fuse holder to positive battery within 20 cm of the same cable.
This fuse location will protect the system and the vehicle against the possibility of a short circuit in the power cable. Be sure to use fuses and a fuse holder adequate for the application

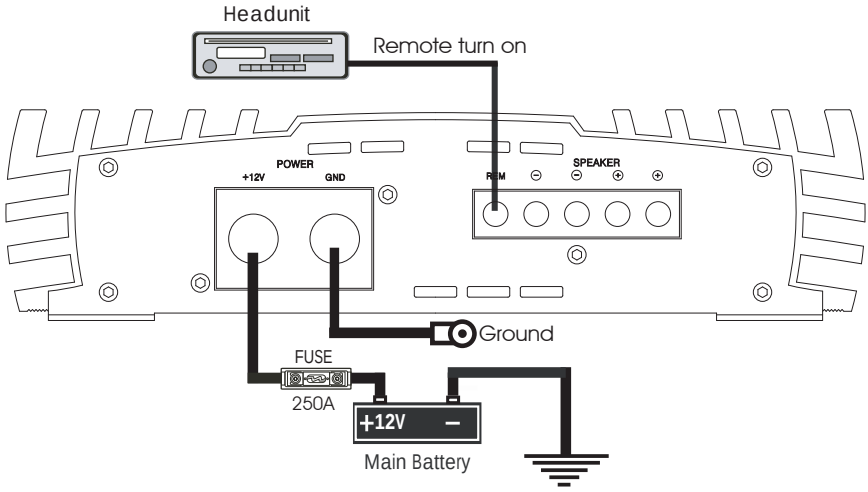
GND (GROUND CONNECTION)

Locate a secure grounding connection as close to the amplifier as possible.
Make sure the location is clean and provides a direct electrical connection to the frame of the vehicle. Connect one end of a short piece of the same size cable as the power cable to the grounding point. Run one end of the cable to the grounding point.
Run the other end of the cable to the mounting location.
Connect the ground cable to the screw terminal labeled as GND.

REM (REMOTE CONNECTION)

Run a remote turn on cable from the switched + 12V source.
This may be a toggle switch, a relay, or your source unit's remote trigger cables, or power antenna trigger cable.
Connect the remote turn on cable to the power terminal labeled as REM.

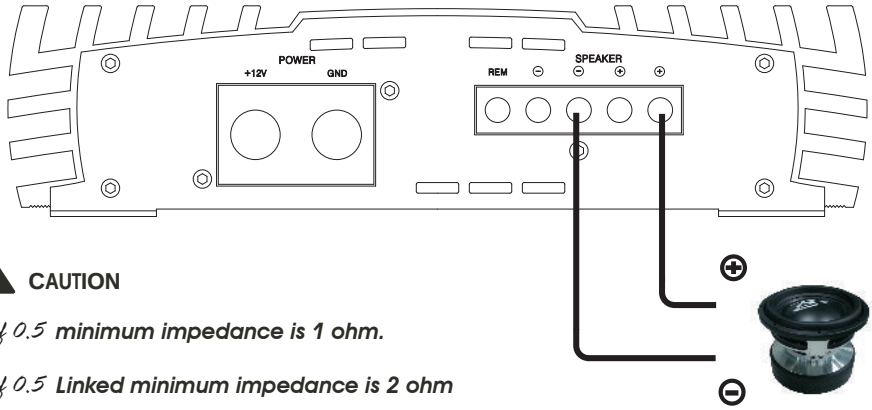
+12V, GND, REM CONNECTION DIAGRAM



4-4. SPEAKER CONNECTION

B2 amplifier series recommends 12 AWG speaker connecting cables.
Run 12 AWG speaker connecting cables from your speakers to amplifiers' mounting location
Keep speaker cables away from power cables and *B2* series amplifier's input cables.
Use grommets anywhere the cables have to pass through the holes in the metal frame or sheet metal. Connect to the speakers according to terminals on each speaker.
Strip 3/8" of insulation from the end of each cable and twist the cables strands tightly.
Make sure there are no stray strands that might touch other cables or terminals and cause a short circuit.
Crimp spade lugs over the cable ends or tin the ends with solder to provide a secure termination.
Connect the cable ends to *B2* series amplifiers as show on the speaker system diagram.

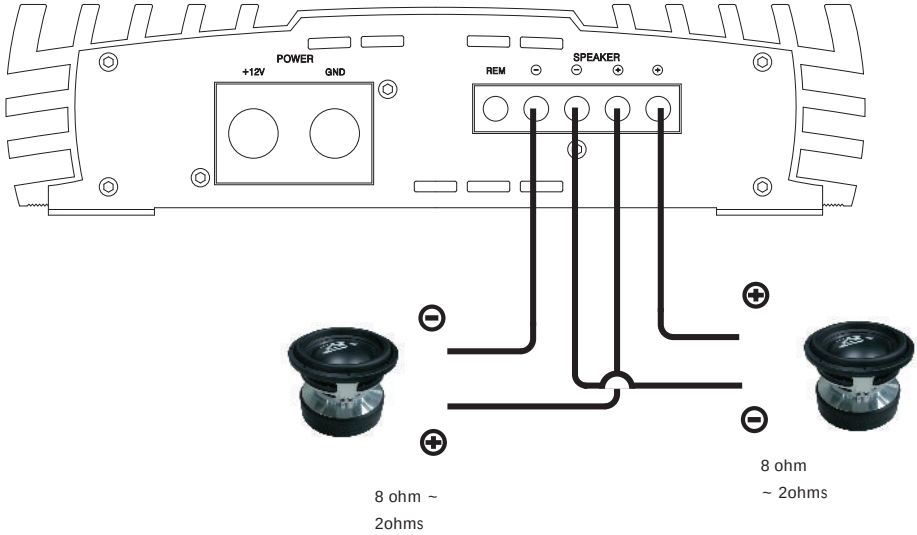
Ref 0.5 **SPEAKER CONNECTION DIAGRAM i**



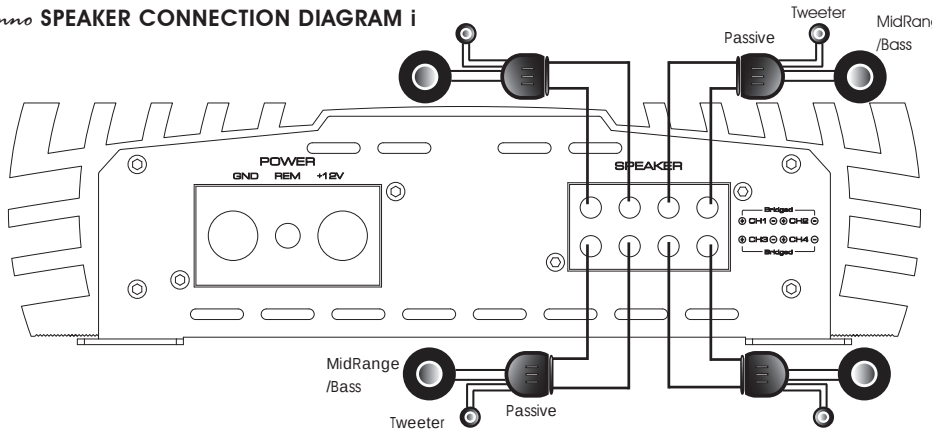
CAUTION

Ref 0.5 minimum impedance is 1 ohm.
or
Ref 0.5 Linked minimum impedance is 2 ohm

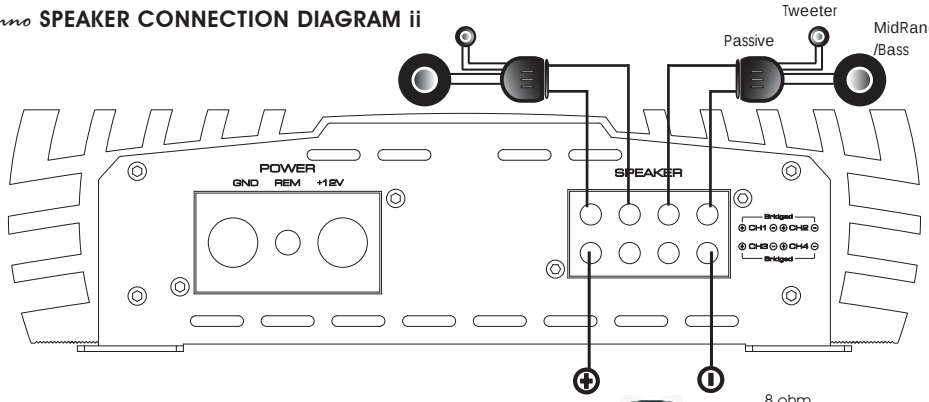
Anno **SPEAKER CONNECTION DIAGRAM ii**



Anno SPEAKER CONNECTION DIAGRAM i

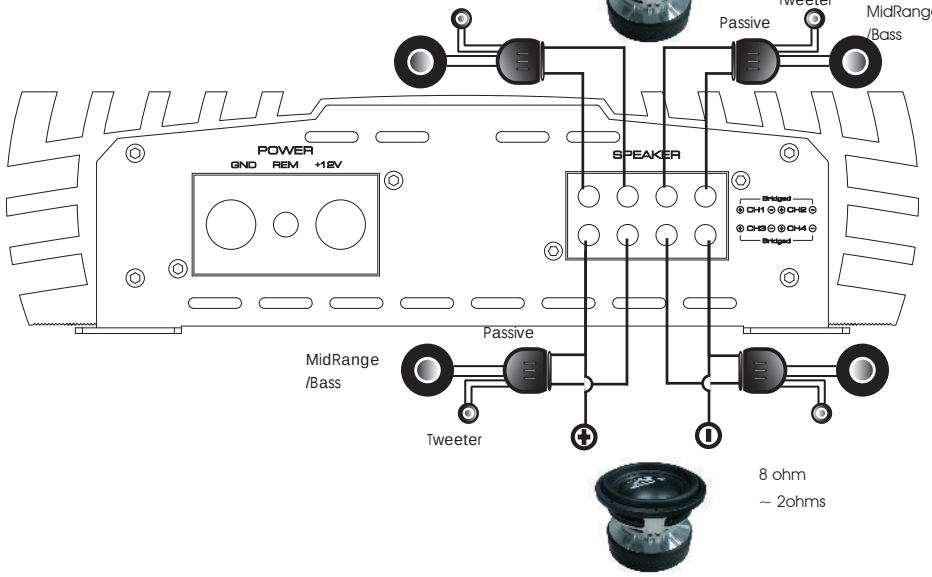


Anno SPEAKER CONNECTION DIAGRAM ii



8 ohm
~ 2ohms

Anno SPEAKER CONNECTION DIAGRAM iii



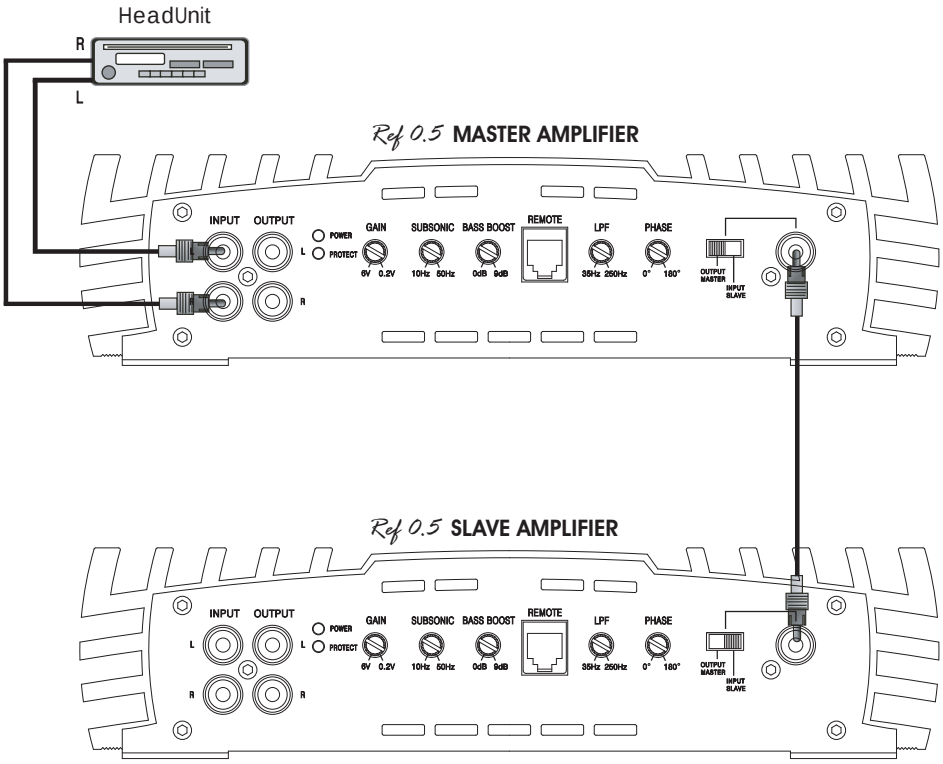
8 ohm
~ 2ohms

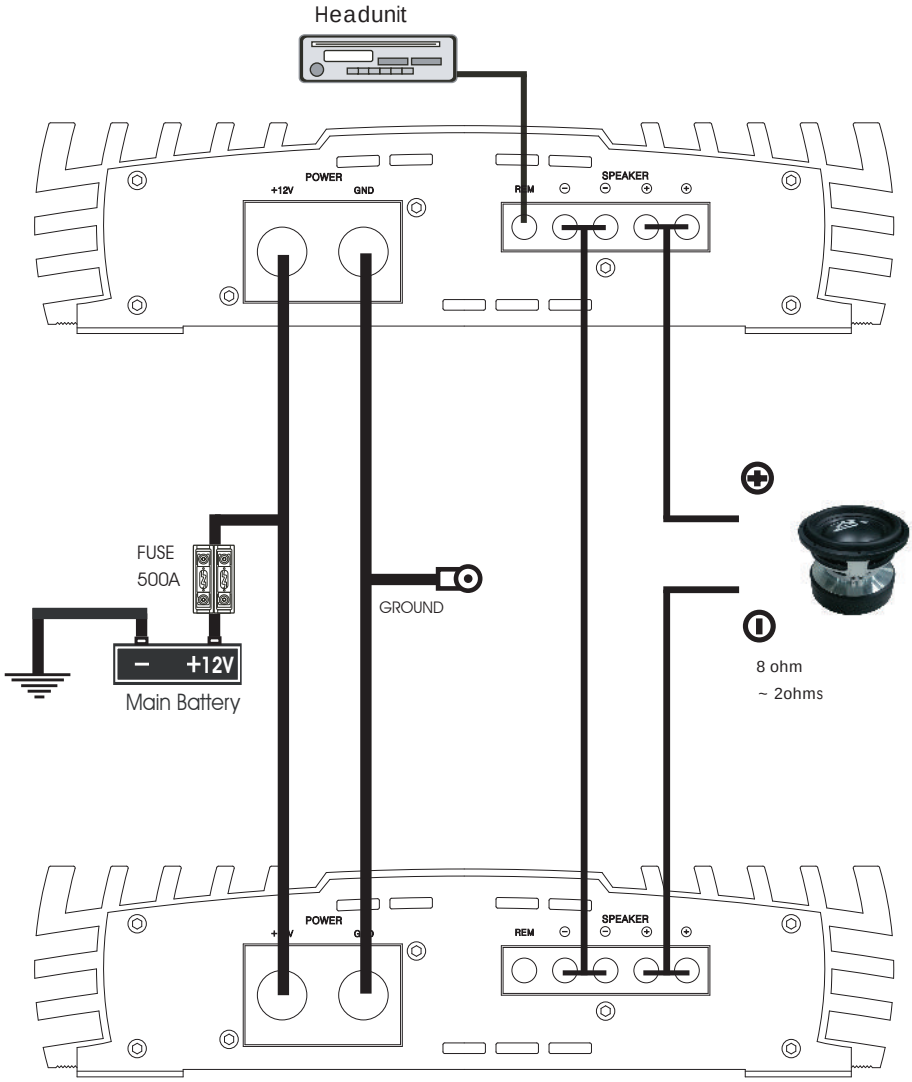
4-5. *Ref 0.5* DAISY CHAIN CONNECTION

Daisy chain connection allows linking of 2 mono amplifiers to work as 1.
Please read the following connection diagram cautiosly to ensure the correct connection.

Step 1. Connect the master *Ref 0.5* amplifier to the head-unit and set its output master and input slave switch to output master position.
Step 2. Connect the master and slave *Ref 0.5* amplifier in daisy chain Rca jack as shown in the diagram.
Step 3. Set slave *Ref 0.5* amplifier output master & input slave switch to slave input position.
Step 4. Connect speaker cable (+) on master *Ref 0.5* amplifier to subwoofer (+)
Step 5. Connect speaker cable (+) on slave *Ref 0.5* amplifier to subwoofer (–)
Step 6. Connect speaker cable (–) on master *Ref 0.5* amplifier to speaker cable (–) on slave amplifier

Ref 0.5 **Minimum daisy chain connection impedance is 2 ohm**
Do not use daisy chain connection in 1 ohm





CAUTION

Ref 0.5 **Minimum daisy chain connection impedance is 2 ohm**
Do not use daisy chain connection in 1 ohm
Ref 0.5 **working Voltage is 9V ~ 16V.**

5. TROUBLE SHOOTING TIPS

NO SOUND (NO OUTPUT)

@ Pls check all connections, cables' rounting, short, voltage at *Ref 0.5 & Anno* amplifiers and headunit
@ Pls check fuses ,If it is blown, pls replace with new ones.
@ Pls check whether speakers are functional. You can connect a AA battery to the speaker terminals to see if there is any movement of the speaker cone.

PROTECTION

@ Pls check overload, overheat (thermal), short and voltage. DC offset
@ Minimum working impedance is 1 ohm for single *Ref 0.5* amplifiers or 2 ohm for linked operation. *Anno* minimum working impedance is 1 ohm stereo or 2 ohm mono
@ If *Ref 0.5 & Anno* amplifiers are shut down due to overheat, they will start up again after a short cooling period.
Please allow for better airflow and ensure there's no obstruction around the *Ref 0.5 & Anno* for thermal protection
@ *Ref 0.5* has Low and high voltage protection. Working Voltage is 9V~16V.
Voltage lower than 8.5V or higher than 16V will cause the amplifier to go into protect.
@ When over 4V DC comes into *B2* series amplifiers, then, they will be DC protected.
Check whether *B2* series amplifiers work after removing RCA-Input
If *B2* series amplifiers are functional, then check DC by checking RCA-input L and R
When DC is over 4V at input, try by replacing headunit or source unit

DISTORTION

@ Adjust the input level and check the quality of the speakers. Replace low quality speakers with upgraded ones.

POOR BASS RESPONSE

@ Pls check speaker cables and reverse the polarity of one channel

BUZZING SOUND

@ Check the amplifier and the head unit ground and ensure it has a good clean connection
@ Check the Rca jack and replace it if faulty or try rerouting it.

WHINING NOISE

@ Engine noise is caused by poor grounding of *B2* series amplifiers, headunit, other components, battery or alternator, so pls check all grounding connection.